INCORPORATING FUNDS OF KNOWLEDGE IN SCHOOL GARDENS

By

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ABSTRACT

Incorporating "funds of knowledge" with schoolyard gardening enriches a child's experience by interacting with their families, local community organizations, school faculty, and other children. A garden community is a social setting and the relationships established by working together cultivate a long-lasting commitment to education. Children are excited to learn, willing to participate, and take ownership of acquiring life skills that are fundamental to pass on from generation to generation. Incorporating "funds of knowledge" provides a venue for those inherited skill sets to be incorporated into the mainstream curriculum of the classroom. The small, yet emblematic, group of children that participated in this project at Leupp Public School were able to gain an

appreciation for planting and growing a garden by being Youth Participant Action Researchers. Conducting home visits to some of the family homes also brought an invitation for increased participation in the school garden. The children incorporated their culture of gardening by learning from elders, community gardeners and their families.

INTRODUCTION/STATEMENT OF FOCUS

The purpose of this project was to incorporate the concept of "funds of knowledge" into school gardening in order to make a child's personal experience more relevant by the connection made to their home culture. This project was conducted at Leupp Public School located on the Navajo Reservation about 50 miles northeast of Flagstaff, Arizona and within the Flagstaff Unified School District. The project was conducted with my third-grade class and the after-school gardening club. Students who participated in this project were mostly between the ages of 8-10 years old. I explored the "funds of knowledge" concept by connecting school curriculum and the Arizona State Standards to students' family knowledge. I further enticed an in-depth engagement and a venue of sharing by networking with the families of my students and with local organizations such as North Leupp Family Farms. By putting into practice the "funds of knowledge" concept, I established the following goals: 1. increase involvement and participation of teachers, families and the community in the garden, 2. increase student engagement and interest in school gardening, and 3. make home-cultural connections so that students could tie together their knowledge of gardening to their

academic learning, environment, and sustainable lifestyle. The intention of this project was to increase the use of the school garden by inviting parents, the community, and fellow teachers to share their "funds of knowledge" in a collaborative forum in order to educate the children on the importance of growing their own food and sustaining their food culture.

RATIONALE

Personal Significance

My fondest memories as a child were spending time in the gardens grown by my family including: growing a vegetable garden with my father, climbing the fruit trees in the backyard, and exploring my grandmother's flower garden. The schools that I went to growing up never had gardening or outdoor education programs. It was not until I moved to Alaska that I returned to my roots as a gardener at the local community garden that I developed a sense of a sustainable lifestyle. I experienced how a community garden brings people together to share, learn, and work together. This concept is a beautiful way of life to instill in young children and develops team-building social skills through gardening.

Gardening has always been an interest of mine and I have done gardening with my students for several years. I noticed that students are fascinated in knowing where food comes from, growing their own vegetables, and enjoying the harvest with the foods we prepare together. Many children have never before tasted most of the vegetables that are grown, and go home telling their families about the garden vegetables. The children are naturally inquisitive with the ecosystem of the garden, and learning the

responsibility of caring for a garden. There are so many activities within the garden that can be incorporated into multiple standards in cross-curricular subjects.

Educational Significance

At the macro-level, today's society is dependent on the modern technologies of obtaining food through processed means, such as: fast-food chains, and grocery stores; resulting in them losing a sense of respect towards sustainability and for the environment. Environmental Science education is crucial to introduce at the elementary level in order to instill a sense of stewardship of the local environment and its resources. This includes: learning about gardening, seed-saving, protecting habitats for pollinators, water harvesting, and recycling through composting. There are movements across the nation that inspire the need for this stewardship, with an emphasis towards environmental science education and climate change. The National Science Teachers Association (NSTA) stresses the importance of environmental science through the Next Generation Science Standards created by the National Research Council (National Science Teachers Association, n.d.,www.nsta.org) Understanding the importance of climate change and its effects on gardening and agriculture help stir students to work in the garden and to search for reasonable ways to incorporate what they have learned at home. Human sustainability and practicing green engineering are all emphasized in today's revamped science curriculum kits. Many national programs such as the World Kids Foundation, university cooperative extensions, and Native American programs such as First Nations Development Institute, all provide grant and outreach programs for gardening education. Teaching ancestral gardening traditions, especially among

Indigenous groups, is key to preserving the food culture in modern times and for future generations. "Funds of knowledge" in the school garden, makes the experience more meaningful for the students as they relate it to their home life; hence, the prominence of embracing the home cultural of my students through gardening.

In Arizona, there are many programs that collaborate with schools to incorporate gardening and agriculture in the classroom. One prestigious program is the Arizona Farm to School Network that includes initiatives to support schools with gardens, and networking, with local farms, to serve locally grown food in the cafeterias (National Farm to School Network, n.d., http://www.farmtoschool.org/our-network/Arizona) The University of Arizona Cooperative Extension Service also provides support to schools and teachers by providing Arizona Agricultural Literacy Days, and the School Food Safety program. Northern Arizona University has a sustainability master's program and garden networks that provide resources for educators. Networking with these organizations is vital to emphasizing the significance of garden education at the elementary level. It also captures the home knowledge that families have on gardens in Northern Arizona, and how to grow certain crops that are adaptable for the local environment in Leupp, Arizona.

In the Leupp area, North Leupp Family Farms (NLFF), Tolani Lake Enterprises, Terra Birds, and Winslow Indian Health Care Center all work together to bring the values of sustainability to the schools in the Leupp community. Leupp Public School continues to work with NLFF and Terra Birds with the "upkeep" of the garden and because of this project, has begun a working relationship with the Coconino County

Health Department and Coconino County University of Arizona Cooperative Extension. All these relationships have inspired more family and community participation in the garden. The partnerships with local farms and community gardens is essential to maintain in order to preserve the continued incorporation of "funds of knowledge" with the students, since many families are active members in these local Leupp community gardens and farms. The end result of the project was having more involvement in the garden with families and local organizations sharing their knowledge of gardening with the children of the school.

LITERATURE REVIEW

The benefit of school gardening in a cross-cultural setting is a positive way for teachers to network with the community. Food culture in gardening can then be defined in a meaningful way by following the theory of "funds of knowledge," (Moll et al., 1992 and Gonzalez et al., 2005) and participant observation, other than hosting the usual or predictable food potluck (Richardson, 2010). Students naturally make notable connections between the various classroom curriculums used in the school to their experiences in the garden as summarized by Larson and Redelings (2015) in best practices for garden-based education. For example, the students in the after-school gardening club share with me what their families grow at home such as squash, melons and fruit trees. The children enjoy gardening, planting seeds, and even pulling weeds. Additionally, children gain an awareness of wellness, healthy eating habits, and a sense of sustainability through gardening, especially when living in a rural area where access

to grocery stores and fresh food are scarce. As I will explain, there are plenty of national, statewide and local programs that support all these aspects of gardening education and many studies (Cobb & Houston, 2011; Fraser-Abder et at., 2010; Lombard et al., 2013) that suggest the benefits of school gardening in promoting wellness.

Wellness and Gardening

Gardening is an excellent approach for wellness, since most communities on the Navajo Nation are more than 30 miles away from the grocery store, and are considered to be in a "food desert," that is, regions relying on gas station convenience stores, that provide processed junk food (Lomard et al. 2013). The study conducted in San Juan County, New Mexico, by Lombard et al. (2013) analyzed the perceptions of Navajo communities on gardening by using focus groups to discuss barriers faced with gardening and wellness. Additionally, the study also aimed to create strategies for future garden-based wellness intervention programs on the Navajo Nation. The interview questions consisted of health topics pertaining to diabetes, traditional gardening topics, and perceived barriers, such as water and land access. Lombard et al. (2013), indicated the following results towards the barriers of establishing a garden: No place to garden or the lack of poor access to water and soil, no time to garden, and lack of knowledge on processing the harvest. However, the participants did appear optimistic towards finding ways to make gardening happen again in their communities. More intriguing indications of the study showed the need to convey gardening through a combination of traditional story exchange, the modern use of multimedia, and respect

for Elders through an intergenerational knowledge transfer, as a crucial way of learning gardening techniques. (Lombart et al. 2013) quotes the following statement from a participant, "You can make it like a lesson plan where you're teaching the kids…and instill in them discipline and hard work you know and those kinds of values need to come back to our kids" (p.6). School gardening improves the consumption of fruits and vegetables for children especially when Indigenous traditions and the engagement of parents are incorporated in the curriculum. When looking at the demographics in the Lombart et al. (2013) study, there are similarities when compared to the Leupp community, because both places are on the Navajo reservation, being an hour drive from a larger city such as Flagstaff, Arizona. Both regions are considered food deserts, and have the need to follow ways of sustainability by producing local foods, in conjunction with traditional food cultures.

Nathan Larson from the Wisconsin School Garden Network collected over his years of school gardening fifteen core principles that represent best practices in garden-based education. These fifteen practices are intended to inform sound pedagogy and illustrate why gardens are such essential centers both for learning and promoting childhood health (Larson & Redelings, 2015). I will highlight five of these fifteen principles that are the most applicable to the research methodology for this project with "funds of knowledge" and YPAR concepts and as well the encouragement of promoting wellness in a school garden through positive relationships, health food choices and physical exercise. The five principles are the following: 1. Let the Garden Be the

Teacher, 2. Let Kids Be the Gardners, 3. Build a Diverse Learning Community, 4. Make Connections to Home and Community, 5. Cultivate a Connection to Food.

Let the Garden Be the Teacher is looking for teachable moments and to plan to incorporate naturally occurring events in the daily instruction as learning goals. Facilitating a meaningful engagement with what is spontaneously occurring in the garden, will capitalize on the natural curiosity of the students about the world about them (Larson & Redelings, 2015). This idea complements well to the Reggio Emilia philosophy as using the environment as the third educator along with a team of two teachers. The use of the environment as the third educator has to be flexible and undergo frequent modification by the children and the teachers to remain up-to-date and responsive to their needs to be protagonists in the construction of their knowledge (Edwards et al., 2012). The garden teaches the children to take wonder and to instill inquiry type questions about their environment and the way nature operates.

Let the Children be the Gardeners is allowing the children to be stewards and allowing them to manage the garden. By providing children with the space to experiment, make mistakes, and learn from their experiences, we help them deeply feel that the garden is their own (Larson & Redelings, 2015). Children then become creators versus consumer of knowledge as they experience first-hand the multiple components of gardening. An important component of YPAR is stepping back as a teacher and trusting the students to carry-on with tasks and allowing the learning to development through experiences. Children can truly incorporate their living knowledge

as they work together independently by sharing attributes they bring from their own personal experiences.

Besides working independently with each other in the garden, the children should also learn to work with diversity people--hence the principal of Build a Diverse Community. When stewarded properly, a school garden can take on a feel of thriving outdoor community center, a diverse human community of all ages and backgrounds, commingling amidst the flowers and vegetables sharing stories, tips, and food (Larson & Redelings, 2015). These healthy relationships develop a sense of purpose and belonging as exchanges of knowledges are shared to further connections with the local community.

Make Connections to Home and Community suggest that by inviting a broader community to be part of the garden, the members will increase the garden's impact and sustainability. (Larson & Redelings, 2015). Ideas for community involvement include a farmer's market stand program or simply bringing vegetables home for the family to enjoy. Children gain a sense of accomplishment when they can provide for their families with healthy food choices. A garden is a social place that brings individuals together, establishes profound relationships, and personable tie from the home to the school. The University of Wisconsin-Madison Arboretum's Earth Partnership for Schools (EPS) and Edible Schoolyard at Martin Luther King Middle School in Berkeley, California are examples of outreach programs that brought a school a school and community together through school gardens. The Edible Garden builds community around food and students gain a connectedness to the world. The Edible Garden has

also constructed a dining commons with the majority of the produce being from the garden, seasonal ingredients, and a reflection of the ethnicity of the students (Crane, 2003). The EPS program works with students from kindergarten to college as well as teachers and citizen volunteers to restore schoolyards and natural areas and to address diversity, pollination prevention, and ecological literacy across age, ecosystem, discipline and culture (Hall & Bauer, 2010). Both programs bring students and community together in a meaningful way, and the students gain ownership by bringing their cultures into their own safe, learning habitat within the garden. Students feel safe and secure within the imaginary realms that come along with the make believe of child play that is instilled within a garden and the joy of getting dirty (Black, 2006; Crane, 2003). These connections also create a sustainable motion to keep the garden alive through volunteerism of the community.

Cultivate a Connect to Food is garden classrooms offering an exceptional learning environment for children to reconnect with good food and to learn exactly where their food comes from through direct experience (Larson & Redelings, 2015). Children need to know what the vegetable looks like when it is grown from seed to harvest and understand how it looks like when it grows on the plant. Students gain an investment and a deep connection with food that they grow. Ron Finley known as the "gangster gardener" from South Central Los Angeles states

> "If kids grow kale, kids eat kale. If they grow tomatoes, they eat tomatoes. But when none of this is presented to them, if they're not shown how food affects the mind and the body, they blindly eat whatever you put in front of them." (https://www.ted.com/talks/ron_finley_a_guerilla_gardener_in_south_central_la, Accessed Nov 21, 2017).

A garden also provides a safe, supportive place for children to come and participate in outdoor physical activity like digging and wheel barrowing. Children also build self-efficacy in mastering gardening and this can carry over to improved performance in academics through an integrated curriculum. The promotion of wellness, yard work-exercise, growth of food skill-sets, sense of sustainability, the inquiry of the life sciences and other STEM concepts, plus the correlation to English Language Arts all contribute to culturally responsive connections.

Importance of Culturally Responsive Connections

Gardening education with the incorporation of "funds of knowledge" helps students to understand and participate in knowledge building. Ladson-Billings (2009) states that "culturally relevant teaching helps students develop necessary skills by building bridges or a scaffolding that meets students where they are (intellectually and functionally), culturally relevant teaching helps them to be where need to be to participate fully and meaningfully in the construction of knowledge" (p.104). Students not only share with others their home knowledge, but they also learn the knowledge that is shared by others in a safe environment. The students become contributors with the skills they have developed at home and build upon their schema with the newly acquired knowledged learned in academics. Ladson-Billings (2009) also captures a teacher's personal experience where she called upon parents and extended family members to demonstrate known skills such as sewing to be taught in the classroom. This integrative and communal approach towards learning with the inclusion of families

and the local community allowed the teacher to make strong connections with knowledge and the school. Networking with the families and including invitations to visit the classroom to teach skill-type lesson allows for additional foundation for building "funds of knowledge" and integration with the school curriculum.

Parent programs such as Linking in Food and Environment (LiFE) in New York City allowed for immigrant mothers to become more involved in their child's school with a scientific approach to food and nutrition. The study included two Dominican American mothers that became involved and established themselves as role models within the parent volunteers in the neighborhood and schools of Washington Heights, New York City. The involvement of parents and their "funds of knowledge" through food was incorporated into a science lessons that further enhanced a culturally responsive connection. Examples of "funds of knowledge" type lesson that parents brought to their LiFE experience included cooking, childcare, gardening, non-traditional medicine, and nutrition (Hagiwara et al., 2007). These are examples that can bring in a high order of comradeship and where the community of a school can bring their cultural "funds of knowledge" on food horticulture and harvesting to contribute to an interactive, all inclusive, learning environment in a school's garden.

Integrating cultural universals in the classroom inside and out is also a technique that can be applied to building an environment where the individual student in a cross-cultural classroom can gain ownership, especially within a school garden. Cultural universals are basic human needs and social experiences found in all societies, past and present, and include food, shelter, clothing, transportation, communication,

family living, money, childhood, government and so on (Alleman et al., 2007). The cultural universals of the individual students can be included in the classroom learning community in many subject areas such as social studies. One of those units can be a food unit that provides opportunities where students can bring examples into the classroom for others to see, taste, and discuss. Students can share or discuss the foods they eat at home and perhaps do a food journal as a homework assignment. Further elaboration with the cultural universal concept can include traditional ways of preparation of foods that are celebrated for special family gatherings or holidays.

Another technique to adapt a higher level of connection across cultures is to do cultural mapping. Cultures are more complex beyond food, holidays, and clothing elements involved and can be explored through creating maps (Schall, 2010). These maps can go even further with the food connection as students can map out their kitchens or even kitchens of their grandparents. Students can in a respective forum how their kitchens are arranged, what is important, and gain an understanding of each other's background. These types of maps however need to be presented in a safe, respectful environment and it is the teacher's role to establish an atmosphere where each student can present their viewpoints of their private lives. If a garden exist in their home then a cultural map of their garden could also be included. Educators can easily incorporate meaningful activities in a multicultural classroom by relating to the students connections to food. Students can share in a safe environment carefully created by the teacher and invite family members to participate.

Some features of the Italian Reggio Emilia philosophy compliment these ideas of community collaboration which include central tenets of sociocultural activity theory. Sociocultural activity theory roots from Lev S. Vygotsky and is used to explain how individual mental functioning is related to cultural, institutional, and historical context, hence the focus of the sociocultural perspective is on the roles that participation in social interactions and culturally organized play in the influencing psychological development (Scott & Palinscar, n.d.). New (2007) highlights five of cultural tenets that have been central to the successes of Reggio Emilia schools which are "the concept of teachers as learners, *progettazione* (long-term project work) as a curriculum vehicle, children's multiple symbolic languages as culturally constructed modes of discourse, the physical environment as a developmental niche, and parental involvement as a forum of civic engagement." (p.6). School gardens or outdoor learning centers become a center as a forum for sharing "funds of knowledge" and civic virtue thus further enhancing the multiethnic network of the school's community.

Another article related to school gardening and multicultural education is a critique written by Troy Richardson from Cornell University. Richardson (2010) evaluates food events such as potlucks to a more progressive and deeper multicultural approach to incorporating "funds of knowledge" to gardening. He critiques the "food, folk, and fun" paradigm from the conceived festival of food consumption, and compares it to the authentic experiences gained in sharing food culture within school gardens. Richardson (2010) also argues that the framework of multicultural education in fostering community collaborations could be established through school gardens becoming

progressive and critical multi-ethnic social transformations. Gardens can create a language of civic and environmental responsibility through the process of multi-ethnic, school-community partnerships. Lastly, Richardson (2010) suggests further investigation in the emergence of multicultural environmental education through school gardening.

Culturally responsive methods and strategies are important to consider when teaching on the Navajo Reservation and incorporating the "funds of knowledge" of the families. It is also important to have an awareness and even better a connection to organizations that can support teachers in delievering culturally appropriate lessons in the classroom. Knowing about local organizations that work with school gardens is vital to continuing a sustainable garden that can be difficult for teachers to endure on their own. There are many organizations that work together with Leupp Public School within the Leupp, Winslow and Flagstaff, Arizona. These organizations have working relationships with the school and will continue to contribute to the overall sustainability of the school garden with support of teaching culturally relevant and traditional ways of gardening.

Local Community Farms and Gardens

The North Leupp Family Farms (NLFF) is a cooperative farm, focused on reestablishing traditional Navajo agricultural and culinary traditions. The goal of NLFF is to promote agricultural sustainability, self-sufficiency, and health for Navajo communities. The farm also offers plots for community gardeners, educational programs, and community building events including harvest festivals (Cobb & Houston,

2011). The farm was established in the 1980s, and is currently expanding with a blue corn mill project, and is a supplier to businesses in Northern Arizona (http://www.flagstaffbusinessnews.com/north-leupp-family-farms-exploring-blue-cornmeal-production/, Accessed August 10, 2015). NLFF is also building a farmer's market where locals can come and purchase fruits and vegetables grown on the farm, as well as a café, which is exciting because the nearest grocery store exists miles away.

The 100-acre NLFF is under a Grand Canyon Trust and has been awarded the USDA Value Added Producer Grant (http://www.grandcanyontrust.org/blog/native, Accessed Aug 10, 2015). The community garden has a Farms to School Partnership with STAR school, a local charter school located about 20 miles away. NLFF also coordinates with Leupp Public School, with growing blue corn and having traditional lessons on the preparation of Native foods such as making kneeling-down bread. Kneeling-down bread is made with fresh corn worked into a dough, and then wrapped into corn husks, and baked underneath the ground with wood -burning coals. The bread is similar to a green corn tamale. NLFF has been supportive this past year with maintaining Leupp school garden and installing the drip system, providing compost, assisting with planting vegetables and refurbishing the school's greenhouse. NLFF also invited the school to conduct field trips to the farm where students were able to get a tour. The continued partnership with NLFF will be a benefit to the children of the school, and will promote healthy choices, wellness, and nutritional values of eating traditional foods.

Tolani Lake Enterprises (TLE) is located in the Tolani Lake community about 25 miles from Leupp Public School and is where many of my students live. TLE envisions a future where native communities thrive in a sustainable, economically viable, and environmentally responsible way. TLE has several initiatives to cultivate their vision to include a green team, community development, and food sovereignty and security. The green team provides organic gardening courses in collaboration with the Navajo Workforce, Northern Pioneer College, and Ashokala gardens. The community development includes activities to improve the overall quality of life and to build healthy communities. Instilling food sovereignty and security is an important initiative for TLE since the Navajo Nation is one of the largest "food deserts" in the country (Tolani Lake Enterprises, n.d.). The "Grow Our Own" is a TLE-sponsored program funded by the Colorado Plateau Foundation that allows the community to grow their own food in area gardens and farms in order to reclaim health, sovereignty, and strengthen culture. TLE hosts workshops and courses at their demonstration garden and orchards, and as well in gardens in area schools and senior centers. TLE also offers other initiatives such as website development, digital storytelling courses, wellness, and youth programs. TLE is in the initial stages of starting a partnership with Leupp Public School and its school garden.

Northern Arizona University's environmental science program works in conjunction with a tribal outreach program, that continues to visit Leupp Public School and teach protocols on environmental science. The program's emphasis on

environmental education is a learning process to increase people's awareness and knowledge about the environment and related issues. The university students that work with the tribal outreach program are Native Americans from Arizona, and make local and cultural connections within their science lessons. The environmental outreach lessons provide an additional facet to the school's garden and to outdoor science instruction.

In summary, a significant amount of research and evidence points out that school gardens at schools bring together multiple levels of "funds of knowledge" from diverse backgrounds therefore allowing a school community to cultivate as a whole shared partnership. Qualitative studies show that school gardens had a strong community-building component, promoted teamwork, student bonding, a broader range of interaction with adults, and community outreach (Blair, 2009). Establishing inclusion refers to principles and practices that contribute to a learning environment in which students feel respected and connected to one another (Ginsberg, 2005). However with self-determination of teachers, students, and community, a school garden can have the four student outcomes: 1. Science learning and school achievement 2. Ecological and environmental awareness and responsible behaviors 3. Knowledge about food systems and nutrition and 4. Positive youth development (Skinner et al., 2012).

THEORETICAL PERSPECTIVE

The theoretical framework of this garden project was based on participant-observant and Youth Participatory Action Research (YPAR) because the students, families, school faculty, and community members were the ones that contributed information through casual conversations and observations (Foster-Fishman et al.,2010; Irizarry, 2009; Richards-Schuster, 2010; Watson & Marcian, 2015). The paradigm for this research project encompassed co-participation because the students had first-hand application to the gardening project. Chollett (2014) states the following on the importance on the first-hand application to gardening "given the current ecological crisis of industrial agriculture, we must enable a new generation of students to challenge the industrial model of food production and to develop the knowledge and the skills to revitalize Indigenous knowledge and reduce our ecological footprint" (p. 95). The "funds of knowledge" theory was applied and this project helped become a cornerstone to the continued building of a healthier community within the elementary school setting.

This research project also included an extended epistemology of knowledge where living knowledge was celebrated through lessons where the students built meaningful cultural connections (Lincoln et al., 2001). In the gardening club, students acted as co-researchers as they immersed themselves in gardening with the responsibilities of pulling weeds, tilling soil, planting seeds, watering plants, and enjoying the harvest. They went home and told their families about their experiences in the school garden, and came back the next day with stories of how they gardened at home or homes of their relatives. The students also learned about teamwork by gaining

a sense of camaraderie and accomplishment as they worked together in the school garden. All of these paradigm positions were recorded through anecdotal observations, watching the students collaborate in the garden, sharing knowledge, and reflecting upon their experiences.

STATEMENT OF BIAS

The ontological elements that I envisioned in my project were on the study of culture, people, interactions, language, and connectedness. My epistemological standpoints rest upon my place in the school and community and differentiated between being the classroom teacher and researcher. I had to have place myself in the role as learner and to have that growth mindset in order to acknowledge the wealth of traits that each child and their family brought to the project. An example as such was treating the home visits as a casual conversation versus a formal parent teacher conference. My epistemological inquiry applied to the concept of "funds of knowledge" to my own worldviews and linking that to my ontological position to the cross-cultural environment of the school garden. This research project entailed the participation of students and their family members by involving the theory of participatory research, which is also known as "living knowledge" (Lincoln et al., 2011). The living knowledge was conducted through the sharing of knowledge, storytelling, gardening exchanges, and small celebrations. The living knowledge involved multiple generations and several cultures such as Navajo, Hopi and Hispanic (including myself as the teacher) in traditional ways of gardening.

METHODS

Data collection methods I utilized in this research project included YPAR where the students in my class applied the "funds of knowledge" theory to gardening methods. YPAR methodology links to foundations of multicultural education as a focus on engaging youth in research connected to the material conditions of their lives (Irizarry, 2009). In order to make connections to the student's lives as a researcher and learner, I included qualitative research methods of anecdotal-type observations, casual interviews and/or conversations with students and adult faculty, and ethnographic-type home visits with families that invited me to their homes. The home visits are suggested in the "funds of knowledge" methodology as way to connect with the participants and their families. Moll et al. (1992) state that "funds of knowledge" research method is based on a combination of ethnographic observations, open-ended interviewing strategies, life histories, and case studies that, when combined analytically, can portray accurately the complex functions of households within their socio-historical contexts. Henry-Stone (2010) suggest that Participatory Action Research (PAR) offers an appropriate framework for research on social sciences because the participatory nature of PAR is inclusive of Native and Indigenous communities in that they be included in the design and conduct of research and as well with the action orientation in sustainability research. Hence tying together the sustainability research that is presented in gardening education with the "funds of knowledge" research methodology. YPAR aspects of the the research project included small writing assignments where students documented their "funds of knowledge" as they reflected upon their experiences in the garden and students video interviewing each other. Another method applied was the

holistic approach to Indigenous methodology with the inclusion of traditional ecological knowledge such as planting of Native crops.

The population that I studied were the students of my third-grade class from the year 2016-2017, the after-school gardening club, family members that volunteered to participate, and the organizations that support the school garden at Leupp Public School. The setting of the project was in the school garden, the classroom, the homes of the family home visits, and the farm at North Leupp Family Farms. Students that were enrolled in my third-grade classroom and any additional students from the after school gardening club participated in the projects with the consent of their legal guardians.

The project was ongoing throughout 2017 beginning in the early spring and concluding in the late fall. Gardening events were mostly conducted during the after-school gardening club, Saturday sessions and during the summer enrichment program. The students were engaged in gardening activities, worked together with parent volunteers and community members, and documented their experiences through writings, drawings, and photographs. The students in the project also created a book where their stories and knowledge can be shared with other students at the school. The book will hopefully be used as a continuity, a documented reference guideline, for future projects in the garden and instill further participation in the garden with other teachers at the school.

A few events did occur to include the piloting of a school-hosted farmer's market with the Coconino County Cooperative Extension through the University of Arizona,

gardening sessions with North Leupp Family Farms and the nearby senior center, and future planned activities with the Coconino County Health Department. Several field trips to the North Leupp Family Farms were also held and organized by the garden coordinator that worked at the school. All activities were centered around the values of growing local food and an awareness towards sustainability in the Leupp area.

The data collection began with informing the families of the garden project with a written letter that explained the basis of "funds of knowledge" and how it could instill a meaningful experience for their children. The letter also described the overall goal of the project and the planned activities. It also included a small questionnaire to find out how much gardening already existed within their families and to see who would be interested in participating in the project. I also held a meeting after school for the families of my students to further explain and answer questions about the project. During this meeting, I was able to coordinate with willing families to volunteer their time and open their home for a potential home visit.

The goal of conducting three home visits was met with the exception of bringing along my principal. Originally, my principal was going to assist me in order to help find the locations of the homes or to translate between Navajo and English. The assistance was not necessary with the three homes that I visited throughout the year because the homes were easy to locate and translation was not needed. The home visits followed the ethnographic method as suggested by the "funds of knowledge" application (Gonzalez et al.,2005). The home visits were all note-taken with the willingness of the family being interviewed. The names of the participants will not be mentioned in the

"Findings and Analysis" section in order to protect the privacy of the family (see appendix).

The home visits also contributed to families coming to the school to participate in gardening activities or in the preparation of certain traditional foods. During these events, the families of my students were invited as well as other members of the community to include elders from the senior center, grandparents, coordinators from local farms, and Flagstaff outreach programs such as Terra Birds. During these events, the students documented their experiences with drawings, small reflections, photographs and video interviews. These sources of data collection were then used to build the gardening book and provide continuity for future projects or lessons in the garden. I observed the overall dynamics of the participants and how they interacted with each other. The project became a living experience by noticing certain students at a given time, quoting their discussions, and maintaining confidentiality by not using their full names. I too, kept a journal of reflections in order to recall my observations throughout the project.

This project mainly incorporated the YPAR research methodology for utilizing the "funds of knowledge" theory in school gardening. Researching the benefits and limitations of YPAR methodology made me consider several factors especially being located in a cross-cultural environment of Navajo background. The benefits were and still are that the children are actively involved in the project, have gained ownership, and increased an awareness of sustainability projects in their community. Leupp Public School is a "No Excuses University" school where the theme is to establish an *esprit de*

corps and atmosphere of college-bound readiness. All the classrooms are set up as universities with college board displays and collegiate-type vocabulary. My classroom is Arizona State University (ASU) and every Friday my students wear college t-shirts from ASU. The focus of YPAR research in creating higher education inspirations weave nicely with the "No Excuses University" pedagogy. "No Excuses University" was founded by Damien and Dan Lopez with the belief that:

> Every child deserves the opportunity to be educated in a way that prepares them for college. When schools exhibit a **cultural of universal achievement** by believing in students, they **collaborate** around that belief. During collaboration, they **align their standards** as a team. As teams **align their standards** as a team. As teams align standards, they need to **assess** standards and **manage the data. T**hen, and only then, can they pursue meaningful **interventions** with their students. (https://noexcusesu.com, Accessed November 19, 2017).

A limiting factor that I anticipated would be challenging and indeed did happen was time for the children to analyze their own data. The children took a long time to synthesize their thoughts and to complete the written work in the time given during the gardening session. Many times, I had to work one on one with some students before school started to gain their inputs on the gardening book and before we knew the bell would be ringing to start school. Working one-on-one was one way that I had to become creative in combining youth and adult PAR. I also recruited some fifth graders to be part of the project and help out with the video interviews since they do film making with their teacher. The fifth grade teacher was also a great help with allowing her fifth grade students to assist the younger third graders in the video interviews. I also struggled with time and having to be flexible with the multiple family obligations that keep my students from coming to the gardening sessions. Sometimes I held Saturday

gardening sessions and I would have a "no show" or many of my student participants were also in afterschool sports that kept them away from the gardening project. The garden coordinator worked only 10 hours a week and so the time she had to work together with me on the project was also limited. The YPAR methodology worked great in a small group setting with the participants that had regular attendance with the gardening project. Within those five or six students is where I saw them take ownership of the project and manage the activities on their own with me as their facilitator.

An additional limitation I anticipated and worried about was that parents may not be willing to participate in the home visit nor have the time to work in the garden due to other obligations such as work. I was happy that most families were inviting to have me come to their home for a visit but some families were not comfortable. Other families invited me for a visit but we could never find the time to actually do the visit. The three visits I did were very pleasant and I spent hours visiting at their home. Work and other family obligations also kept many parents from coming to the gardening session even on Saturdays. I did have one grandmother come quite often and she was a wonderful addition to the project with sharing her knowledge on plants. My principal, being born and raised in Leupp himself, was also very helpful in assisting me in finding ways to get more participation in the garden. He introduced me to the coordinator of the nearby senior center and I was able to having a gardening session with some elders. My principal also assisted with the school-hosted farmers market that brought in local farmers to sell their produce and other organization to showcase gardening, farming and sustainability concepts. All in all, having the Saturday gardening sessions is what

brought success to the gardening project because even with the limiting factors it gave sufficient time to work together in a small group setting.

FINDINGS/ANALYSIS

Introduction

The gardening project began in the late fall of 2016 by preparing for the project and fully implementing the "funds of knowledge" concept in the early spring of 2017. Throughout the project, I frequently revisited the research questions and used them as guidelines as I planned gardening activities events and coordinated the home visits. The goals of the gardening project were to: 1. increase involvement and participation of teachers, families and the community in the garden, 2. increase student engagement and interest in school gardening, and 3. make home-cultural connections so that students could tie together their knowledge of gardening to their academic learning, environment, and sustainable lifestyle.

The project first launched by holding a meeting after school with the families of my third-grade class in order to provide information about the project, explain "funds of knowledge" and to answer any questions. Five families attended the evening meeting and I later followed through by submitting letters home, making phone calls, and connecting during parent-teacher conferences. Altogether about 70% of my students and families signed the informed consent to participate in the gardening project. At the informational meeting, several family members agreed to volunteer and were willing to participate in the home visits while others wanted me to meet their extended family

members that garden. The next day, I gave the project presentation to my third-grade class and answered questions for my students. Some students told me that they would not be able to participate and others seemed thrilled to work in the garden. Even though I had about 70% of my students sign the informed consent, I had only about 5-6 students out of the 25 that fully committed to the project with frequent attendance. I also had students and families come and go and volunteer their time as much as possible. Overall, I was pleasantly surprised at the outcome and the willingness of the families to volunteer in the project.

Home Visits

After granted permission with the signed Informed Consent Form (see Appendix), I started to work with the children and families. The home visits were essential in order to establish rapport, a working foundation for the gardening project and ways to incorporate new student learning. According to Moll et al., (2005), "the funds of knowledge project is not about replicating what the students have learned at home, but about using students' knowledge and prior experiences as a scaffold for new learning" (p.135).I was able to conduct three home visits which was my overall goal. In order to provide confidentiality, I will name the families A, B and C.

Family A

The first home visit was with Family A and was made during spring break on March 14, 2017. They live about 15 miles from Leupp in the community of Birdsprings. The family consists of the mother, grandmother, aunt and two cousins of my third-grade

student. The home was warm and inviting with a wood-burning stove heating the living room decorated with framed family photos, quilted blankets and a fish aquarium. Most

Figure 1. Barrel racing practice in Birdsprings, Arizona. March 14, 2017

of the visiting was with the grandmother who is the head of the household and the family historian. It was nice just to sit in the living room and hear the stories of the family members as the grandmother shared and explained the photographs on the wall. The hours went by fast and I ended up spending the entire afternoon at their house.

We visited for many hours, then we made tacos and I offered to make Spanish rice to go along with the enchiladas I had brought for the family,and afterwards I was invited to go horseback riding. The family did not have a lot of background knowledge on gardening but a wealth of knowledge in ranching, especially working with horses. The children in the household were all involved in the local junior rodeos and the grandmother told me that her late husband was known for breaking-in horses. The family at that time had two horses that were in stables located across the highway and directly in front of their house. It was a fun afternoon learning how to barrel race and

maneuver the horse in figure-eight patterns as illustrated in Figure 1. The grandmother jokingly mentioned that if anything they could provide horse manure for the garden and were willing to learn and help out. The home visit was a success. I gained plenty of information from the family and they became an integral part of the gardening project.

Family B

The visit with Family B was also a pleasant experience with visiting the home of another student that lived together with her mother and grandmother. Their home was located close to the school in one of the family housing areas. This home visit was conducted on Friday, April 21st just before the "Father-Daughter" Dance at the school and so my student was busy preparing for the dance. I was offered Navajo tea to drink and I sat in the living room and visited with the grandmother who is also a gardening lover. The room was decorated with family photographs and student artwork made by my student. I was able to visit with the grandmother who showed me everything that she had planted and grown around the house. She has many fruit trees and plants growing around the yard in an area that is hard to grow due to the amount of bedrock and caliche. She definitely has a green thumb and has cultivated many plants with transplants, growing them by seed and nurturing with compost. She gave me some pumpkin and squash seeds to use for planting in the garden and told me that seed saving was her favorite part of planting. She also gave me some wild Navajo tea that she had

Figure 2. Picking wild tea near Leupp Arizona on April 21, 2107

picked and prepared by roasting the plant instead of just letting it dry. A unique way that her family prepares the Navajo tea that gives it a richer taste.

She then offered to take me to go pick Navajo tea, so I took her to the place where she finds the plant that makes the tea. The grandmother told me that she prefers to pick the plant in early spring when it has young shoots and before it flowers, the plant is known as *greenthread*. It was a nice experience and the grandmother ended up being one of the regular participants in the garden activities, even without her granddaughter present.

Family C

The last family visit was conducted right after a summer gardening session in early June where I was invited for lunch and the visit ended up being spur of the

moment. Family C consists of my third-grade student, his parents, and two little sisters. This family is known for their cooking and so I could not say no to lunch, but it was also a great opportunity to do an ad hoc family visit. My student's father is Navajo and his mother is Filipina and both cultures are embraced in the home. The family does not garden but they prepare many foods, cater, and sell baked goods at the Leupp flea market every Saturday. Even though Family C does not garden, my student and his sister are both into the sciences that are incorporated in the garden activities such as studies on soils, life cycles and insects.

During the visit, I was fed tacos, a fresh watermelon smoothie, and guacamole ice cream which is a Filipino dessert. I was also told of the history of the home that they lived in which used to belong to one of the missionaries and was built in the 1920s. The home had been refurbished by the father's family and sits close to the Little Colorado River. The parents also shared with me their love story and how they met. The love of reading is instilled in that home with plentiful amounts of books and resources for the children to learn, including a dry erase board in the dining room. I also had a chance to further explain my goals with the gardening project to both parents and they gave me their support. My student and his sister became active participants in the garden and provided lots of insight into the creation of the gardening book.

In summary, the home visits were instrumental in the outcomes of the student participation in the garden and introducing their families to "funds of knowledge" even though not tied directly to vegetable gardening. (Moll et al., 2005) states that "the deeper relationships we develop with our students and their families, all of us become

more invested in and committed to the educational process." The students' commitment to the gardening project became stronger as the relationship developed with simply spending quality time with the children. The families enjoy to visit, share their family histories, and were hospitable. I gathered my findings and incorporated them into planned activities of the garden especially during the gardening sessions.

Gardening Sessions

The gardening sessions were held mostly during the afterschool program called Family and Community Team for Students (FACTS), on Saturdays, and during the summer school program. Participation during FACTS was fluid as students were not all available due to other activities such as sports or being picked up by their parents in the middle of the gardening session. I got to work with many students during this time even though they did not participate in the in-depth Saturday sessions. Holding the gardening sessions after school did not allow time to work more comprehensively on the project and many family members were not available to volunteer during those times. Even though time was a limiting factor, the students were still able to accomplish many tasks such as working on: their writings, drawings of the garden, and video interviews. Teachers were also more available and willing to participate during FACTS versus on a Saturday. Two teachers volunteered their time and were able to participate in some of the activities held during FACTS.

The Saturday sessions were where the "funds of knowledge" theory and methods of YPAR were truly observed with students taking ownership of the project. A few Saturday sessions were held in the spring and summer. During the rainy monsoon

season, I tried to hold the sessions more frequently so that the students can see the garden flourish and harvest what was available. Attendance on Saturdays was sporadic with small groups and a couple of times there were no-shows. The students and families that did come were regular attendees that ultimately contributed to the majority of the project. The sessions were held in the mornings due to the heat of the day. The school's courtyard provided a crisp shade and made working in the garden pleasant. The students and adult volunteers would work together with weeding, watering and harvesting the ready vegetables. They also made time to interview each other and shared what they recently did at home with gardening.

The coordinator from North Leupp Family Farms (NLFF) was instrumental with showing the families traditional ways of gardening especially with growing corn. One of the best Saturday sessions was held on Earth Day on April 22nd and that was the day we prepared the garden beds and planted seeds. Stacey Jensen from NLFF brought starters, seeds, soil amendments, and a traditional Navajo planting stick. He showed the families how to use the planting stick to plant the corn seeds by poking the soil to make a hole. They planted blue corn and another white corn variant plus beans and squash to make a three sisters garden. A three sister's garden is made up of squash, beans, and corn growing together in the same area each plant supports the other with nutrients in order to thrive. According to Kruse-Peeples, (2016) utilizing the corn, beans and squash together in your garden draws upon centuries of Native American agricultural traditions and expertise. The families also planted seeds for cilantro, pepper

plant starters, tomatoes, and greens such as kale. The children also planted the squash and pumpkin seeds donated by my student's grandmother.

On that same day, we also added some depth to the circular-cardinal direction plot by adding more sandstone rocks that the students had gathered around the school as illustrated in Figure 3. The cardinal direction plot represents the four sacred mountains of the Navajo which are the San Francisco Peaks to represent the West, Mount Blanca to represent the East, Mount Taylor to represent the South, and Mount

Figure 3. Project participants moving rocks for the circular garden bed in Leupp, Arizona. April 22, 2017

Hesperus to represent the North. The children planted watermelon, zucchini, sunflowers and morning glory seeds and all the plants grew very well in that area. Next year, the children want to grow the plants that traditionally represent the four directions such as corn, beans, pumpkin, and pollinator plants to represent pollen. That day's gardening session was a success and encouraged the children to continue to participate in the other gardening sessions that were held in the summertime.

During the summer, I was able to coordinate with the FACTS summer program

and held a few gardening sessions during the week both in the morning and evenings. My principal introduced me to the coordinator of the neighboring senior center and a few elders from the center participated in a gardening session. Figure 4 shows when the the seniors joined the FACTS summer program and the children gave them a tour of the garden. They also painted some of the sandstone rock to be used as placards to show what is growing. Together, with the children, the seniors created beautiful pieces of art

Figure 4. Students giving a tour for the seniors from the senior center at Leupp Public School in Leupp, Arizona. June 6, 2017.

to be represented in the garden. The senior center wants to start their own garden, to get the elders outside to plant, and to work more often with the children. Working with the senior center is one of the projects I hope to continue by arranging frequent visits with the children and building a garden area for them. The children can then have another community connection and further appreciate working with the elderly.

Farmer's Market

Another community connection was working together with the University of Arizona (UofA) Cooperative Extension of Coconino County and piloting a school-sponsored farmer's market. My principal, Fit Kids instructor, another school teacher and myself worked together with the cooperative extension by inviting local

Figure 5. Group picture of the Farmer's Market participants in Leupp, Arizona. September 16, 2017.

farmers and organizations to participate. Figure 5 is a group picture of the farmer's market participants which included, Stacey Jensen from NLFF, a representative from the Coconino Health Department that coordinates gardening outreach programs in Leupp, and Roots Farm that sells organically made sprouts. We had tasting booths, sold produce from NLFF, wildflower seed ball making station, and flower pot painting. The gardening club participants also handed out seed packets that they harvested from the school garden. The farmer's market had a small but steady arrival of locals coming to see what the school had to offer. Some visitors asked for a tour of the school garden and so the students gave them tours explaining what they grew. The farmer's market is

planned to be a future event and we hope to have more again next year during the monsoon season when many vegetables are harvested. We all enjoyed seeing the children working together, tasting the different vegetables and fruit, and learning health benefits of gardening.

Terra Birds

Terra Birds is another Flagstaff organization that provides gardening lesson and materials for Leupp Public School. They visit the school about 3-4 times a year to work on projects with the students. Terra Birds installed a rain entrapment for water harvesting, landscaped with native plants, and helped amend the soils for both the

Figure 6. Terra Birds showing the students how to safely handle a shovel in Leupp, Arizona. October 24, 2017.

winter and spring seasons. This last fall, they came to our school and prepared the beds for the winter season. Figure 6 illustrates Terra Birds teaching the students how to safely handle a shovel. Terra Birds also showed the students how to amend soil with organic materials and taught the children the importance of cover cropping in order

provide nutrients to the soil after a growing season. Terra Birds will continue to visit the school this year and will help out with the ongoing greenhouse project.

The Greenhouse

The greenhouse is another project that was started by the gardening coordinator that was hired for the school year of 2016-2017 under the Navajo Coordinated Approaches to School Health grant. The gardening coordinator and her family rebuilt

Figure 7. Stacey Jensen from North Leupp Family Farms preparing the greenhouse beds lasagna style in Leupp, Arizona. October 24, 2017.

the greenhouse that had been vandalized and constructed gardening beds. Together with the gardening club, they painted the greenhouse and designed a beautiful sign for the door. Stacey Jensen from NLFF continued with the project by adding soil to the beds using the lasagna method as shown in Figure 7. The lasagna method is built with layers of cardboard, compost, manure, soil amendments, and soils that are native to the

region. The students enjoyed seeing the demonstration of building the lasagna layers in the greenhouse and are excited to grow some cool season vegetables this winter.

PRODUCT

The gardening project includes a children's book created by the student participants and a google sites website that showcases the gardening project. The development of the children's book was fun to create with the students with their input and ideas. The book was time consuming but the hours worked on the book will be a great resource for the school. The book was created on shutterfly.com which I found to be the easiest format because I could post a digital copy to the google sites and share a hard copy with the school's library.

I started the foundations of the google sites website which includes great happenings, children's work, a photo gallery, and a continuity section where lesson plans, blogs, tips and contact information can be shared with the teachers, faculty, students, and families of Leupp Public School. The website will continue to be updated frequently as new developments, lessons are created, and projects happen in the garden.

PLANS FOR DISSEMINATION

I plan to have all products for this project posted on the google sites website that I created for the garden and can be accessed at the following link (https://sites.google.com/fusd1.org/leupp-public-school-gardening). I am also going to provide copies of this paper to the participants whose names, pictures and videos were

used. I also plan to have a small gathering in the garden to say thank you to all the participants with either doing arts and crafts or a little tea party. After all the participants have received a copy, I will share the google sites website link on the Leupp Public School's website. I hope to have a hard copy of the gardening book displayed in the school's library.

REFLECTIONS ON THE PROCESS

The main discovery I encountered in this project is that consistent student participation and attendance is key to incorporating fully the "funds of knowledge" concept and YPAR. A student that learns is one that participates in the classroom not only in an academic sense but as well socially. A quote by John Seely Brown highlighted in an interview by Bauwens (2008) correlates well with my discovery on student participation "we participate therefore we are" and that understanding is socially constructed through conversations about that content and through grounded interactions, especially with others, around problems and actions. As I reflect upon this project, I will address the goals that I originally based this project on.

make home-cultural connections so that students could tie together their knowledge of gardening to their academic learning, environment, and sustainable lifestyle.

Increase involvement and participation of the teachers, families and community in the garden

Involvement and participation of teachers, families, and community did increase since there was hardly no participation prior to this project. There are families that are now invested in the garden and are willing to help when extended the invitation. One

grandmother that participated in project, came to the school outside the planned gardening sessions to help pull weeds in the courtyard. A few teachers are now staying after school to participate in the gardening club and hopefully more will garden this upcoming spring. The addition of the greenhouse will also allow for more gardening opportunities for teachers to use a resource. The teacher that first established and built the garden beds recently returned to teach at Leupp Public School and is involved with the gardening activities. Community involvement has increased as well with beginning to work this year with the UofA Coconino County Cooperative Extension and the Coconino Health Department. Continuing the farmers market the next growing season will also bring in more community involvement with local farmers and other organizations that promote wellness and sustainability lifestyles.

Increase student engagement and interest in school gardening

The students definitely became more engaged and interested in gardening especially the participants that contributed the most. Some students started planted seeds at home and would have their parents send me text message photos of their plants. Others invited their extended family members to the garden sessions and received tours by the children. Many gain a wealth knowledge on what entails to grow food in Leupp and what is needed for a successful garden. The students were also inquisitive with the ecosystem and the biology of the garden especially with all the insects.

Another observation I noticed is that the children enjoyed tasting and eating the fresh vegetables and fruit they grew in the garden. Many had never tasted the flavors of

the vegetables such arugula, kale and fresh green greens. Some ask me how I prepared the fresh green beans because they have only eaten them from a can. Introducing the children and their families to new varieties of vegetables and ways of eating healthy ties back to the importance of wellness while living in a food desert. The children can then return home and share their new taste buds to their families and incorporate healthy eating habits, especially with the harvest that is shared from the garden. I hope that the students continue to build their knowledge in garden, continue to work the school's garden, and live a healthy eating lifestyle.

Make home-cultural connections so that students could tie together their knowledge of gardening to their academic learning, environment, and sustainable lifestyle.

The cultural-home connections became lived experiences for the student participants especially when learning how to compost and seed-saving. The students realize they have most of the organic materials needed to start a healthy garden when they learned what they can use fertilize and amend the native soil. The students also learned how to cultivate and take care of the plants growing around them with the various activities conducted throughout the year. The students and including myself gained a vibrant feel of their local environment by learning how much farming, local gardens,and the importance of living a sustainable lifestyle.

I learned that some families have a lot of gardening background while other did not really garden but had some some extended families members involved in gardening. The families that did have knowledge on gardening did provide some

insights particularly with plants grow best in Leupp, watering schedules and the traditional values of some of the plants. Some traditional values of plants include the use of corn pollen for ceremonies and the use of the planting stick. I am hoping to continue to incorporate more traditional value type gardening sessions as I continue to coordinate with local organizations. One soon to be session will be working together with the Coconino Health Department representative who will teach the students how to make a planting stick with greasewood. The representative provides outreach programs for families in Leupp to establish home gardens. I also wish to learn and share more with my students innovative ways to make our garden flourish.

Personally Learned

I personally learned lots of attributes as a teacher and a researcher. I also learned how to step back, trust the children to take ownership, and become an observer. This was the most challenging for me as a teacher since I am so used to be directly involved and managing the activities in the garden. I had to let go in order to allow the student participants to work on their own. I also had to be flexible to their ideas but I did have to direct them to ideas that could be feasible with the resources readily at hand.

Another attribute I acquired was with the home visits and entering the home as a learner rather than a teacher. The home visit were more to learn about the families and not like a parent-teacher conference in discussing the child's academics. At the beginning of the meeting, I would explain to the family that my purpose was to learn about them and once I made that clear it was easy for the families to share their family

stories. They seemed more comfortable with me visiting their home as learner of their child versus a teacher and made the conversion flow in amiable manner. Developing trust and embracing the families knowledge allowed for further embracing of the child's learning both academically and socially.

Conclusion

"Funds of knowledge" theory and the Youth as Participatory Action Research (YPAR) methodology together did improve students engagement and prepared the youth for higher education by gaining a feel of research skills. Furthermore, the students gained a stewardship towards their environment and community by being more connected to their home culture through the school garden. The youth learned critical thinking and analytical skills that are necessary for today's global community. The student participants, especially at this elementary level, overcame their shyness by taking on ownership of the garden by conducting research in their own realm such as giving garden tours. Including YPAR within this project also incorporated indigenous methodology and "funds of knowledge" by including traditional knowledge and worldviews to create a more meaningful experience for all participants.

This project will sustain itself through the continuation of after school gardening club, outreach projects with local gardening organizations, and networking with the other teachers of the school. My plans are to assign garden beds to individual teachers and to conduct gardening projects that are connected to school curriculum. The google sites website will also be a shared forum and will proceed with new developments as the garden evolves. Invitations for families to visit and participate in the garden are

planned for the near future and in hopes that more students will gain a sense of ownership this garden place that they cultivate. Overall, I hope to continue the partnerships, establish deeper relationships with the children and families, and continue to cultivate the growth of the Leupp Public School Garden.

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Appendix

Informed Consent Form
Incorporating Funds of Knowledge in School Gardening

IRB # 971515
January 18, 2017

The entire consent form should be written using the first-person pronoun "I" or "we" as appropriate to refer to the researcher(s). The potential volunteers should be referred to as "you". The reading level of this document must be between the 6-8 grade level for general adult population. Use the spelling and grammar tool in the word processing document to check the reading level in the summary section.

Description of the Study: Introduce yourself and your research project.
You are being asked to allow your child take part in a study about incorporating "funds of knowledge" in school gardening. Funds of Knowledge is the background knowledge of what your child knows from what they taught and learned at home. The goal of this study is see how what is learned at home can be used in the classroom. Your child will be included in this project by participating as researcher. Your child will be doing experiments and finding out the importance of plants and growing your own food. You are being asked to allow your child to take part in this study because your child is enrolled in my class and/or is in the gardening club. Additionally, I am also asking family members to volunteer their time to participate in gardening activities and as well to allow me to conduct an informal home visit if you so wish. Please read this form carefully. Please ask questions and discuss with me more about the project before making a decision on whether or not to participate.

If you wish to have your child participate in the project it will be held during school hours and as well as after school. I will be also holding several Saturday classes if you wish your child to participate if they want to. Your child will be working together with the class as researchers and will be making a story book or video on gardening. The children will come up with the types of gardening activities. You will be given updates on what children are making in the garden. Other activities that your child will be journaling, discussions, taking pictures and video recordings of the gardening lessons.

If you want volunteer, you will be asked to join the class with the gardening activities. You may also be asked to teach the children what you know about gardening, preparations of foods and any other knowledge you may know. You will also be asked

by myself if you would be willing to have me do an informal home visit with Mr. Ryan Chee, school principal. You can volunteer as much as you would like at any time of this project and you can also leave the project at any time. If you decide to withdraw from the project, please let me know in person that you wish to no longer participate. All data pertaining to you and your child will not be included in the research study and will be destroyed.

If you will be conducting your research as part of some other event or activity (e.g. as part of classroom activities, community events, medical visits, etc.), you must clearly identify which procedures or activities are part of the study and which are not.

Risks and Benefits of Being in the Study: Describe any reasonable foreseeable risks, discomforts, inconveniences, and how these will be managed. For research involving more than minimal risk, explain any professional services, treatment or referrals that may be available and provide the contact information for these services.

Risk Statement:

- This study does not have any parts that should make students feel uncomfortable, or create negative feelings. Your child will be given the opportunity to participate as much as he/she like to with sharing their home knowledge. There are no risks to you if you take part in this study and you as a volunteer can participate as much as you would like in regards to sharing your cultural backgrounds.

Benefit Statements:

- If the participant will/may directly benefit from being in the study, add: The potential benefit to your child for taking part in this study is increase engagement in school, which can result in better performance in class. The "funds of knowledge" theory is to increase a child's background by connecting it to what is taught in class. The work in the garden will also help your child to increase their awareness of the environment. I do not guarantee that he/she will benefit from taking part in this study.

Confidentiality: Describe the extent to which you will protect the participants' confidentiality with respect to their participation in the study and to their responses or information. Describe how private information or any sensitive participant data will be stored and managed to control access and assure confidentiality. If information will be released to any other party (including the funding agency) for any reason, state the person/agency to whom the information will be furnished, the nature of the information, and the purpose of the disclosure. Researchers need to understand the difference between confidentiality and anonymity. Confidentiality means the researcher will have access to individually identifying information (e.g., the participant's name, social security number, driver's license number, etc.) for each participant. Anonymity means the researcher will collect NO identifying information from participants (e.g., no names, no

social security numbers, no driver's license numbers, etc.) If participants can be assured of anonymity, then this must be clearly explained in the Informed Consent Form.

If activities will be audio- or videotaped, describe who will have access, if they will be used for educational purposes, and whether and when they will be erased or destroyed.

· Any information obtained about your child and yourself from the research will be kept confidential.
· Any information with your child's and your name attached will not be shared with anyone outside the research team.
· We will code your information with a number so no one can trace your answers to your name.
· We will properly destroy paperwork and securely store all research records.
· Your child's and your name will not be used in reports, presentations, and publications.

The Form should also state (if appropriate) that there are limitations to confidentiality that can be granted the participant (e.g., identification of criminal wrongdoing).

Voluntary Nature of the Study: You must make it perfectly clear to the participant that their participation is voluntary. This is particularly true when there is an actual or perceived power difference (e.g. employer/employee, teacher/student, doctor/patient, etc.

Your decision to allow your child and as well as for you to participate in the study is voluntary. You are free to choose whether or not to take part in the study. It is also up to you whether or not he/she can take part in the study. If you decide to take part in the study you can stop at any time or change your mind and ask to be removed from the study. If you decided to allow your child to take part in the study you stop at any time, or change your mind and ask for your child to be removed from the study. Whether or not you choose to participate, will not affect your child's grades.

Contacts and Questions:
If you have questions now, feel free to ask me. Also if you would like an interpretive explanation of this project in Navajo, Mr. Ryan Chee, the school principal, is available to verbally explain further or answer any questions. If you have questions later, you may contact

Dr. Maureen Hogan – Professor of Education at University of Alaska Fairbanks – 907-474-6474 or mphogan@alaska.edu
Danitza Hill – Teacher, Leupp Public School, Flagstaff Unified School District, 520-727-1257 or dhill3@fusd1.org

The UAF Institutional Review Board (IRB) is a group that examines research projects involving people. This review is done to protect the rights and welfare of people involved the research. If you have questions or concerns about your rights as a research participant, you can contact the UAF Office of Research Integrity at 474-7800 (Fairbanks area) or 1-866-876-7800 (toll-free outside the Fairbanks area) or uaf-irb@alaska.edu.

Statement of Consent & Assent:
I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to allow my child to participate in this study and as well as myself. I am 18 years old or older. I have been provided a copy of this form.

Does child understand? Yes or No
Does child agree? Yes or No

_____ _____
Signature of Participant & Date Name of Child

_____
Signature of Person Obtaining Consent and Date

Link to Children's Book

https://share.shutterfly.com/action/welcome?sid=kDauGbdi2Ysnhw&cid=SM-PBAPP

Link to Google Sites Website

https://sites.google.com/fusd1.org/leupp-public-school-gardening/home